(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2000－50525
（P2000－50525A）
(43)公開日　平成12年２月18日(2000.2.18)

(51)Int.Cl.⁷	識別記号	ＦＩ		テーマコード（参考）
Ｈ０２Ｊ　9/00		Ｈ０２Ｊ　9/00	Ｒ	５Ｇ００３
7/00		7/00	Ｑ	５Ｇ０１５

審査請求　未請求　請求項の数３　ＯＬ　（全６頁）

(21)出願番号　特願平10－213918

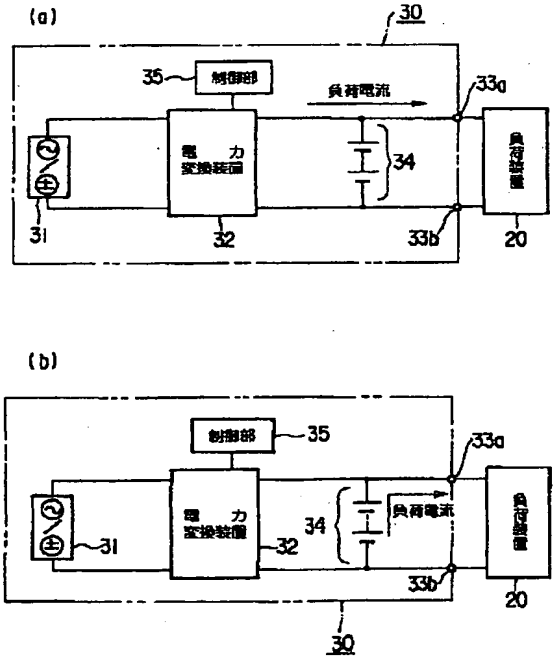
(22)出願日　平成10年７月29日(1998.7.29)

(71)出願人　593063161
株式会社エヌ・ティ・ティ　ファシリティーズ
東京都港区芝浦三丁目４番１号
(72)発明者　村瀬　正敏
東京都港区芝浦三丁目４番１号　株式会社エヌ・ティ・ティファシリティーズ内
(72)発明者　関谷　和幸
東京都港区芝浦三丁目４番１号　株式会社エヌ・ティ・ティファシリティーズ内
(74)代理人　100058479
弁理士　鈴江　武彦　（外５名）

最終頁に続く

(54)【発明の名称】　無停電給電装置及び蓄電池劣化判定方法

(57)【要約】
【課題】蓄電池の放電率が高い場合であっても蓄電池の劣化を容易に判定することができる無停電給電装置を提供すること。
【解決手段】負荷装置２０に直流電流を供給する電力変換装置３２と、出力端子に並列に接続されるとともに、電力変換装置３２作動時は浮動充電され、かつ、電力変換装置３２非作動時は負荷装置２０に所定の直流電流を供給する蓄電池３４と、電力変換装置３２の出力電圧を制御するとともに、その出力電流を計測する制御部３５とを備え、制御部３５は、電力変換装置３２の出力電圧を負荷装置２０が正常動作する電圧以上であって、かつ、蓄電池３４の開放電圧より低い電圧まで低下させ、電力変換装置３２の出力電流が所定値以上になるまでの経過時間に基づいて蓄電池３４の劣化を判定するようにした。



1

【特許請求の範囲】

【請求項１】負荷部に直流電流を供給する電力供給部と、

前記出力端子に並列に接続されるとともに、前記電力供給部作動時は浮動充電され、かつ、前記電力供給部非作動時は前記負荷部に所定の直流電流を供給する蓄電池と、

前記電力供給部の出力電圧を制御するとともに、その出力電流を計測する制御部とを備え、

前記制御部は、前記電力供給部の出力電圧を前記負荷部が正常動作する電圧以上であって、かつ、前記蓄電池の開放電圧より低い電圧まで低下させ、前記電力供給部の出力電流が所定値以上になるまでの経過時間に基づいて前記蓄電池の劣化を判定することを特徴とする無停電給電装置。

【請求項２】負荷部に直流電流を供給する電力供給部の出力端子に並列に接続されるとともに、前記電力供給部作動時は浮動充電され、かつ、前記電力供給部非作動時は前記負荷部に所定の直流電流を供給する蓄電池の劣化を判定する蓄電池劣化判定方法において、

前記電力供給部の出力電圧を前記負荷部が正常動作する電圧以上であって、かつ、前記蓄電池の開放電圧より低い電圧まで低下させて前記蓄電池を放電状態とする電圧降下工程と、

この電圧降下工程において、前記電力供給部から前記負荷部への電流値に基づいて前記蓄電池の劣化を判定する劣化判定工程とを具備することを特徴とする蓄電池劣化判定方法。

【請求項３】前記劣化判定工程は、前記電流値が所定値以上になるまでの経過時間に基づいて判定を行うことを特徴とする請求項２に記載の蓄電池劣化判定方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、蓄電池を備えることにより直流電流を停止することなく供給する無停電給電装置に関し、特に蓄電池の劣化を判定することができるものに関する。また、直流電流を出力する電力供給部に接続された蓄電池の劣化を判定するための蓄電池劣化判定方法に関する。

【０００２】

【従来の技術】図３の（ａ），（ｂ）は、従来の無停電給電システムの一例である無停電給電装置１０の一例を示す構成図、図４は従来の蓄電池劣化判定方法における蓄電池端子電圧を示すグラフ、図５は蓄電池の放電特性を示すグラフである。

【０００３】無停電給電装置１０は、交流又は直流の電源１１と、この電源１１の出力端子に接続され、所定の電圧を出力する電力変換装置１２とを備えている。電力変換装置１２は、通信機器や電子計算機等の負荷装置２０に接続される外部出力端子１３ａ，１３ｂとを備えている。また、電力変換装置１２の外部出力端子１３ａ，１３ｂには蓄電池１４が接続されている。さらに、図３中１５は、電力変換装置１２の出力電圧を制御するとともに、蓄電池端子電圧を計測する制御部を示している。

2

【０００４】このように構成された無停電給電装置１０は、図３の（ａ）に示すように、通常は電源１１からの電力を電力変換装置１２において変換し、負荷装置２０に供給するとともに、蓄電池１４へ浮動充電している。

【０００５】なお、電源１１からの電力の供給が何らかの原因で停止した場合には、蓄電池１４が放電することで負荷装置２０に電力が供給され、負荷装置２０は連続的に電力の供給を受けることができる。

【０００６】一方、蓄電池１４の劣化が進んでいると、停電した場合に、所定の性能を発揮せず、負荷装置２０の電力の供給が停止するという問題が発生する。このため、定期的に蓄電池１４の劣化を判定する必要がある。

【０００７】蓄電池１４の劣化は次のようにして判定する。なお、図４は、蓄電池１４の劣化を判定する際の蓄電池端子電圧の変化を示すグラフである。なお、図４中V_Fは通常の作動時における電圧、すなわち浮動充電電圧（電力変換装置定常出力設定電圧）であり、V_Aは負荷装置２０が正常動作を維持できる最低の電圧、すなわち電力変換装置出力低下時設定電圧であり、V_Eは放電終止電圧（負荷装置許容最低入力電圧）、ΔＶは電圧計測誤差である。

【０００８】制御部１５により電力変換装置１２の出力電圧を電力変換装置出力低下時設定電圧V_Aまで低下させ、図３の（ｂ）に示すように、蓄電池１４を放電状態とし、蓄電池１４の端子電圧を測定する。このとき、図４中Ｑに示すように、蓄電池端子電圧が検出電圧Ｖ。まで低下した場合には、劣化していると判断する。なお、図４中二点鎖線Ｒに示すように、検出電圧Ｖ。まで低下しなかった場合には、劣化していないと判断する。

【０００９】

【発明が解決しようとする課題】上述したような蓄電池の劣化判定方法では、次のような問題があった。すなわち、蓄電池１４が劣化している場合、蓄電池端子電圧は出力低下時設定電圧V_Aまで低下し、電力変換装置が出力低下時設定電圧V_Aにて負荷装置２０へ電力を供給することになる。このため、蓄電池端子電圧は、出力低下時設定電圧V_Aより下がらない。よって、検出電圧Ｖ。は、電力変換装置の出力低下時設定電圧V_Aより電圧計測誤差ΔＶ以上高い電圧値とすることで、蓄電池端子電圧の低下を確実に検出している。

【００１０】しかしながら、蓄電池は図４に示すように、放電率が高くなると放電初期から蓄電池端子電圧が低くなる特性がある。なお、図４中Ｃは蓄電池定格容量を示し、０．１Ｃ，０．１６Ｃ，０．２３Ｃ，０．６Ｃの各数字は蓄電池の放電率である。

【００１１】検出電圧Ｖ。は、電力変換装置の出力低下

時設定電圧V_Aより高い電圧値であるため、放電率が高い場合には、蓄電池１４放電開始直後に蓄電池端子電圧が検出電圧Ｖ。以下である電力変換装置出力低下時設定電圧V_A近くまで低下する場合があった。このため、蓄電池端子電圧が検出電圧Ｖ。とならず、蓄電池１４の劣化が判定できないという問題があった。

【００１２】そこで本発明は、蓄電池の放電率が高い場合であっても蓄電池の劣化を容易に判定することができる無停電給電装置及び蓄電池の劣化判定方法を提供することを目的としている。

【００１３】

【課題を解決するための手段】上記課題を解決し目的を達成するために、請求項１に記載された発明は、負荷部に直流電流を供給する電力供給部と、前記出力端子に並列に接続されるとともに、前記電力供給部作動時は浮動充電され、かつ、前記電力供給部非作動時は前記負荷部に所定の直流電流を供給する蓄電池と、前記電力供給部の出力電圧を制御するとともに、その出力電流を計測する制御部とを備え、前記制御部は、前記電力供給部の出力電圧を前記負荷部が正常動作する電圧以上であって、かつ、前記蓄電池の開放電圧より低い電圧まで低下させ、前記電力供給部の出力電流が所定値以上になるまでの経過時間に基づいて前記蓄電池の劣化を判定するようにした。

【００１４】請求項２に記載された発明は、負荷部に直流電流を供給する電力供給部の出力端子に並列に接続されるとともに、前記電力供給部作動時は浮動充電され、かつ、前記電力供給部非作動時は前記負荷部に所定の直流電流を供給する蓄電池の劣化を判定する蓄電池劣化判定方法において、前記電力供給部の出力電圧を前記負荷部が正常動作する電圧以上であって、かつ、前記蓄電池の開放電圧より低い電圧まで低下させて前記蓄電池を放電状態とする電圧降下工程と、この電圧降下工程において、前記電力供給部から前記負荷部への電流値に基づいて前記蓄電池の劣化を判定する劣化判定工程とを具備するようにした。

【００１５】請求項３に記載された発明は、前記劣化判定工程は、前記電流値が所定値以上になるまでの経過時間に基づいて判定を行うようにした。上記手段を講じた結果、次のような作用が生じる。すなわち、請求項１に記載された発明では、制御部は、電力供給部の出力電圧を負荷部が正常動作する電圧以上であって、かつ、蓄電池の開放電圧より低い電圧まで低下させることで、蓄電池を放電させる。蓄電池が放電し、電圧が低下すると、電力供給部からの電力供給が再開されるので、これを検出することにより、蓄電池の劣化を判定することができる。

【００１６】請求項２に記載された発明では、電力供給部の出力電圧を負荷部が正常動作する電圧以上であって、かつ、蓄電池の開放電圧より低い電圧まで低下させることで、蓄電池を放電させる。蓄電池が放電し、電圧が低下すると、電力供給部からの電力供給が再開されるので、これを検出することにより、蓄電池の劣化を判定することができる。

【００１７】請求項３に記載された発明では、電流値が所定値以上になるまでの経過時間に基づいて判定を行うようにしたので、容易に蓄電池の劣化を判定することができる。

【００１８】

【発明の実施の形態】図１の（ａ），（ｂ）は本発明の一実施の形態に係る蓄電池劣化判定方法が適用される無停電給電装置３０を示す図であり、図２は、蓄電池３４の劣化を判定する際の蓄電池端子電圧、蓄電池３４の出力電流及び電力変換装置３２の出力電流の変化を示すグラフである。なお、これらの図において上述した図３，４と同一機能部分には同一符号を付し、その詳細な説明は省略する。

【００１９】無停電給電装置３０は、交流又は直流の電源３１と、この電源３１の出力端子に接続され、所定の電圧を出力する電力変換装置３２とを備えている。電力変換装置３２は、通信機器や電子計算機等の負荷装置２０に接続される外部出力端子３３ａ，３３ｂとを備えている。また、電力変換装置３２の外部出力端子３３ａ，３３ｂには蓄電池３４が接続されている。さらに電力変換装置３２には、その出力電圧を制御するとともに、出力電流を計測する制御部３５が接続されている。

【００２０】このように構成された無停電給電装置３０は、図１の（ａ）に示すように、定常動作時は、電源３１からの電力を電力変換装置３２において変換し、負荷装置２０に供給するとともに、蓄電池３４を浮動充電している。なお、電力変換装置３２の出力電圧は、電源３１の入力電圧や出力電圧が変動した場合でも常に一定の浮動充電電圧V_Fを出力できるような安定化機能を有している。

【００２１】このような状態で電源３１からの給電が一定時間以上（通常２４時間以上）継続している場合には、蓄電池３４は満充電状態であるため、蓄電池３４への浮動充電電流は僅かであり、図１の（ａ）に示すように電力変換装置３２の出力する電流の大部分は負荷電流として負荷装置２０に供給されている。

【００２２】また、図１の（ｂ）に示すように、電源３１からの電力の供給が何らかの原因で停止した場合には、蓄電池３４が放電することで負荷装置２０に電力が供給され、負荷装置２０は連続的に電力の供給を受けることができる。

【００２３】蓄電池３４の劣化は次のようにして判定する。なお、図２の（ａ）中V_Fは通常の作動時における電圧、すなわち浮動充電電圧（電力変換装置定常出力設定電圧）であり、V_Aは負荷装置２０が正常動作を維持できる最低の電圧、すなわち電力変換装置出力低下時設

5

定電圧であり、V_E は放電終止電圧（負荷装置許容最低入力電圧）である。また、図２の（ｂ）は、蓄電池３４の出力電流、図２の（ｃ）は電力変換装置３２の出力電流の変化を示すグラフである。

【００２４】電力変換装置３２の出力電圧を電力変換装置出力低下時設定電圧V_Aまで低下させ、蓄電池３４を放電状態とし、蓄電池３４の端子電圧を測定する。これに伴って、蓄電池３４が劣化していると、一定時間後に出力低下時設定電圧V_Aまで蓄電池端子電圧が低下する。電力変換装置３２から負荷装置２０への電力の供給が再開される。

【００２５】図２の（ｂ），（ｃ）に示すように、蓄電池３４の出力電流が低下すると、電力変換装置３２から負荷装置２０へ電流が供給される。この電力変換装置３２からの出力電流が制御部３５により検出される。制御部３５では、電力変換装置３２の出力電圧を電力変換装置出力低下時設定電圧V_Aまで低下させてから、出力電流が検出されるまでの時間ｔを計測し、この時間ｔが予め定められた時間以下である場合には、蓄電池３４が劣化している判定する。

【００２６】上述したように、本実施の形態に係る無停電給電装置３０においては、蓄電池３４の放電率が高い場合であっても、電力変換装置３２の出力電流を検出することで、容易に蓄電池３４の劣化を判定できる。

【００２７】なお、制御部３５においては、電力変換装置３２の出力電流の有無を検出するようにしてもよく、また、出力電流の大きさを検出するようにしてもよい。なお、本発明は実施の形態に限定されるものではなく、本発明の要旨を逸脱しない範囲で種々変形実施可能であるのは勿論である。

【００２８】

【発明の効果】請求項１に記載された発明によれば、制御部は、電力供給部の出力電圧を負荷部が正常動作する＊

6

＊電圧以上であって、かつ、蓄電池の開放電圧より低い電圧まで低下させることで、蓄電池を放電させる。蓄電池が放電し、電圧が低下すると、電力供給部からの電力供給が再開されるので、これを検出することにより、蓄電池の劣化を判定することができる。

【００２９】請求項２に記載された発明によれば、電力供給部の出力電圧を負荷部が正常動作する電圧以上であって、かつ、蓄電池の開放電圧より低い電圧まで低下させることで、蓄電池を放電させる。蓄電池が放電し、電圧が低下すると、電力供給部からの電力供給が再開されるので、これを検出することにより、蓄電池の劣化を判定することができる。

【００３０】請求項３に記載された発明によれば、電流値が所定値以上になるまでの経過時間に基づいて判定を行うようにしたので、容易に蓄電池の劣化を判定することができる。

【図面の簡単な説明】

【図１】本発明の一実施の形態に係る無停電給電装置の構成を示す図。

【図２】同無停電給電装置における蓄電池劣化判定時の蓄電池端子電圧、蓄電池の出力電流及び電力変換装置の出力電流の変化を示す図。

【図３】従来の無停電給電装置の構成を示す図。

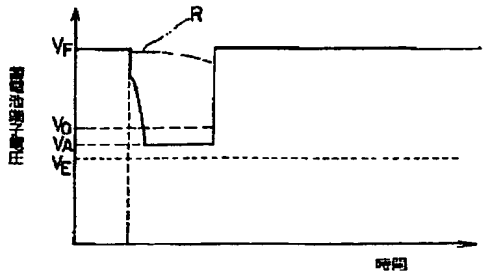
【図４】蓄電池劣化判定方法における蓄電池端子電圧の変化を示す図。

【図５】蓄電池の放電特性を示す図。

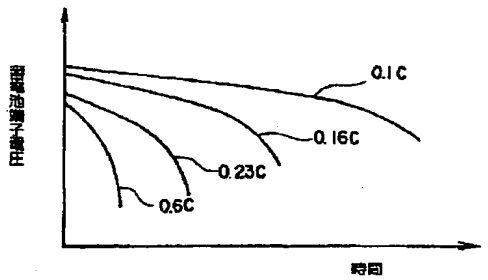
【符号の説明】

３０…無停電給電装置
３１…電源
３２…電力変換装置
３４…蓄電池
３５…制御部

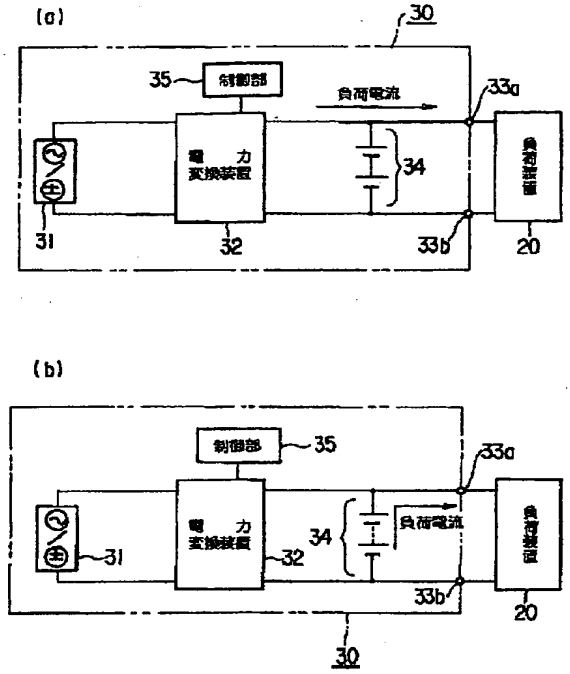
【図４】



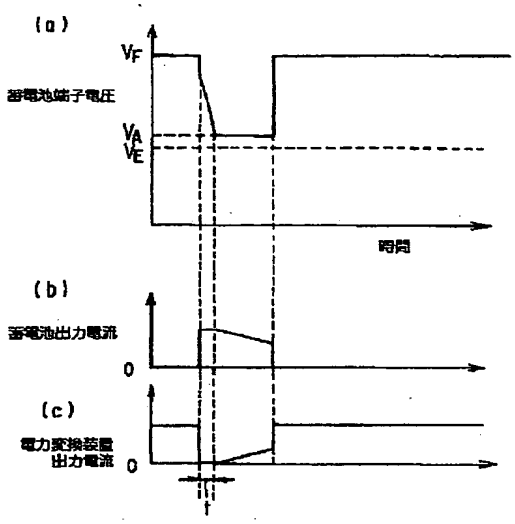
【図５】



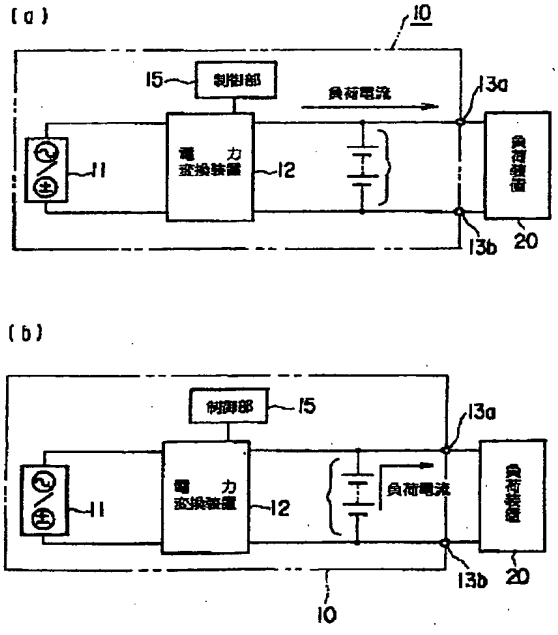
【図１】


(a)
30
35
制御部
負荷電流
33a
電力変換装置
34
31
32
33b
20
(b)
制御部
35
33a
電力変換装置
34
負荷電流
31
32
33b
20
30

【図２】


(a)
V_F
蓄電池端子電圧
V_A
V_E
時間
(b)
蓄電池出力電流
0
(c)
電力変換装置出力電流
0
t

【図３】


(a)
10
15
制御部
負荷電流
13a
電力変換装置
11
12
13b
20
(b)
制御部
15
13a
電力変換装置
11
12
負荷電流
13b
20
10

フロントページの続き

(72)発明者　青木　忠一
東京都港区芝浦三丁目４番１号　株式会社
エヌ・ティ・ティファシリティーズ内

(72)発明者　川越　祐司
東京都港区芝浦三丁目４番１号　株式会社
エヌ・ティ・ティファシリティーズ内

Ｆターム(参考)　5G003 AA01 BA01 CA11 EA08 GC05
5G015 FA06 FA18 JA34 JA54 KA03

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-050525
(43)Date of publication of application : 18.02.2000

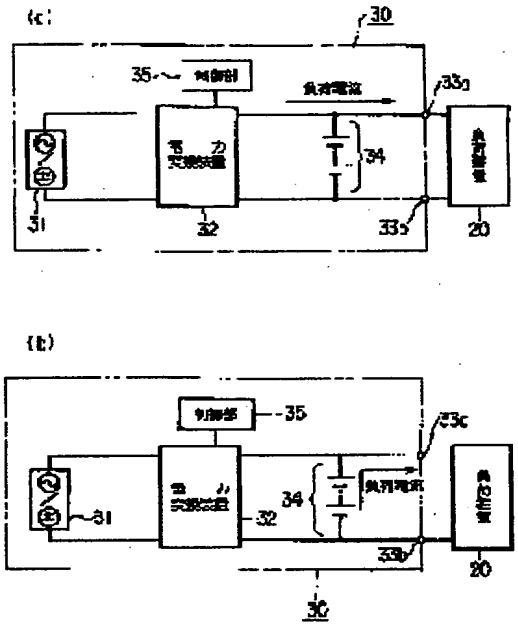
(51)Int.Cl. H02J 9/00
H02J 7/00

(21)Application number : 10-213918
(22)Date of filing : 29.07.1998

(71)Applicant : NTT POWER & BUILDING FACILITIES INC
(72)Inventor : MURASE MASATOSHI
SEKIYA KAZUYUKI
AOKI CHUICHI
KAWAGOE YUJI

(54) UNINTERRUPTIBLE POWER SUPPLY DEVICE AND METHOD FOR DISCRIMINATING DETERIORATION OF BATTERY

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an uninterruptible power supply device which can easily discriminates deterioration of a battery, even when the discharging rate of the battery is high.
SOLUTION: An uninterruptible power supply device is provided with a power converter 32, which supplies a direct current to a load device 20, a battery 34 which is connected in parallel with the output terminal of the supply device, is trickle charged when the converter 32 is operated, and supplies a prescribed direct current to the load device 20 when the converter 32 is not operated, and a control section 35 which controls the output voltage of the converter 32, as well as measures the output current of the converter 32. A control section 35 discriminates deterioration of the battery 34 based on the time required, until the output current of the converter 32 becomes a prescribed value or higher, after lowering the output voltage of the converter 32 to a value which is higher than the normal operating voltage of the load device 20, but lower than the open voltage of the battery 34.



LEGAL STATUS

[Date of request for examination] 18.11.2002
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-050525
(43)Date of publication of application : 18.02.2000

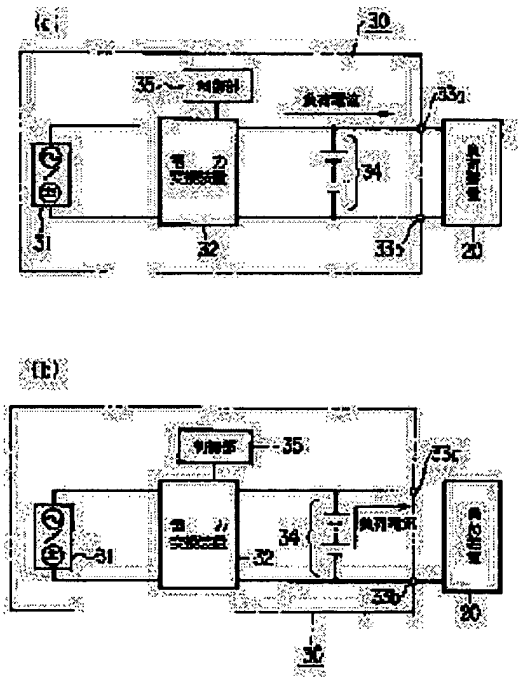
(51)Int.Cl. H02J 9/00
H02J 7/00

(21)Application number : 10-213918
(22)Date of filing : 29.07.1998

(71)Applicant : NTT POWER & BUILDING FACILITIES INC
(72)Inventor : MURASE MASATOSHI
SEKIYA KAZUYUKI
AOKI CHUICHI
KAWAGOE YUJI

(54) UNINTERRUPTIBLE POWER SUPPLY DEVICE AND METHOD FOR DISCRIMINATING DETERIORATION OF BATTERY

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an uninterruptible power supply device which can easily discriminates deterioration of a battery, even when the discharging rate of the battery is high.
SOLUTION: An uninterruptible power supply device is provided with a power converter 32, which supplies a direct current to a load device 20, a battery 34 which is connected in parallel with the output terminal of the supply device, is trickle charged when the converter 32 is operated, and supplies a prescribed direct current to the load device 20 when the converter 32 is not operated, and a control section 35 which controls the output voltage of the converter 32, as well as measures the output current of the converter 32. A control section 35 discriminates deterioration of the battery 34 based on the time required, until the output current of the converter 32 becomes a prescribed value or higher, after lowering the output voltage of the converter 32 to a value which is higher than the normal operating voltage of the load device 20, but lower than the open voltage of the battery 34.



LEGAL STATUS

[Date of request for examination] 18.11.2002
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] While connecting with juxtaposition at said output terminal with the power feed zone which supplies a direct current to the load section While floating charge of the time of said power feed zone actuation is carried out and controlling the battery which supplies a predetermined direct current to said load section, and the output voltage of said power feed zone at the time of said power feed zone un-operating It has the control section which measures the output current. Said control section It is more than the electrical potential difference to which said load section carries out normal actuation of the output voltage of said power feed zone. And the feeder system characterized by judging degradation of said battery based on elapsed time until it makes it fall to a low electrical potential difference and the output current of said power feed zone consists of open circuit voltage of said battery beyond a predetermined value non-cut [the electric current] off.
[Claim 2] While connecting with juxtaposition at the output terminal of the power feed zone which supplies a direct current to the load section In the battery degradation judging approach of judging degradation of the battery by which floating charge of the time of said power feed zone actuation is carried out, and a predetermined direct current is supplied to said load section at the time of said power feed zone un-operating In the voltage drop process which is more than the electrical potential difference to which said load section carries out normal actuation of the output voltage of said power feed zone, and is reduced to an electrical potential difference lower than the open circuit voltage of said battery, and makes said battery a discharge condition, and this voltage drop process The battery degradation judging approach characterized by providing the degradation judging process of judging degradation of said battery based on the current value from said power feed zone to said load section.
[Claim 3] Said degradation judging process is the battery degradation judging approach according to claim 2 characterized by judging based on elapsed time until said current value becomes beyond a predetermined value.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to what can judge especially degradation of a battery about the feeder system supplied without stopping a direct current by having a battery non-cut [the electric current] off. Moreover, it is related with the battery degradation judging approach for judging degradation of the battery connected to the power feed zone which outputs a direct current.
[0002]
[Description of the Prior Art] The block diagram showing an example of the feeder system 10 (a) of drawing 3 and whose (b) are examples of the conventional non-cut [the electric current] off electric supply system non-cut [the electric current] off, the graph which shows the battery terminal voltage in the battery degradation judging approach of the former [drawing 4], and drawing 5 are graphs which show the discharge property of a battery.
[0003] It connected with the output terminal of the power source 11 of an alternating current or a direct current, and this power source 11, and the feeder system 10 non-cut [the electric current] off is equipped with the power converter 12 which outputs a predetermined electrical potential difference. The power converter 12 is equipped with the external output terminals 13a and 13b connected to the load equipments 20, such as communication equipment and a computer. Moreover, the battery 14 is connected to the external output terminals 13a and 13b of a power converter 12. Furthermore, 15 in drawing 3 shows the control section which measures battery terminal voltage while controlling the output voltage of a power converter 12.
[0004] Thus, as shown in (a) of drawing 3 , while the constituted feeder system 10 non-cut [the electric current] off usually changes the power from a power source 11 in a power converter 12 and supplies it to load equipment 20, floating charge of it is carried out to the battery 14.
[0005] In addition, when supply of the power from a power source 11 stops by a certain cause, power is supplied to load equipment 20 because a battery 14 discharges, and load equipment 20 can receive supply of power continuously.
[0006] On the other hand, when degradation of a battery 14 was progressing and the electric current is cut off, the predetermined engine performance is not demonstrated but the problem that supply of the power of load equipment 20 stops occurs. For this reason, it is necessary to judge degradation of a battery 14 periodically.
[0007] Degradation of a battery 14 is judged as follows. In addition, drawing 4 is a graph which shows change of the battery terminal voltage at the time of judging degradation of a battery 14. In addition, the inside VF of drawing 4 is the electrical potential difference at the time of the usual actuation, i.e., a floating charge electrical potential difference, (power-converter stationary output programmed voltage), and is VA. It is a programmed voltage at the time of the minimum electrical potential difference on which load equipment 20 can maintain normal actuation, i.e., power-converter loss of power, and VE. Discharge final voltage (the load equipment permission minimum input voltage) and deltaV are electrical-potential-difference measurement errors.
[0008] a control section 15 -- the output voltage of a power converter 12 -- the time of power-converter loss of power -- programmed voltage VA up to -- as it is made to fall and is shown in (b) of drawing 3 , a battery 14 is made into a discharge condition and the terminal voltage of a battery 14 is measured. at this time, it is shown in [Q] drawing 4 -- as -- battery terminal voltage -- detection electrical potential difference V0 up to -- when it falls, it is judged that it has deteriorated. in addition, it is shown in the two-dot chain line R in drawing 4 -- as -- detection electrical potential difference V0 up to -- when it does not fall, it is judged that it has not deteriorated.
[0009]
[Problem(s) to be Solved by the Invention] There were the following problems by the degradation judging approach of a battery which was mentioned above. Namely, when the battery 14 has deteriorated, battery terminal voltage falls to a

programmed voltage VA at the time of loss of power, and a power converter is a programmed voltage VA at the time of loss of power. Power will be supplied to load equipment 20. For this reason, battery terminal voltage is a programmed voltage VA at the time of loss of power. It does not fall. Therefore, detection electrical potential difference V0 It is a programmed voltage VA at the time of the loss of power of a power converter. It is considering as a high electrical-potential-difference value more than electrical-potential-difference measurement error deltaV, and the fall of battery terminal voltage is detected certainly.

[0010] However, a battery has the property that battery terminal voltage becomes low, from the early stages of discharge, when a discharge rate becomes high, as shown in drawing 4 . In addition, battery rated capacity is shown by the inside C of drawing 4 , and several characters each of 0.1C, 0.16C, 0.23C, and 0.6C are the discharge rate of a battery.

[0011] Detection electrical potential difference V0 It is a programmed voltage VA at the time of the loss of power of a power converter. Since it is a high electrical-potential-difference value, when a discharge rate is high, battery terminal voltage is the detection electrical potential difference V0 immediately after battery 14 discharge starting. It is a programmed voltage VA at the time of the power-converter loss of power which is the following. There was a case where it fell to near. For this reason, battery terminal voltage is the detection electrical potential difference V0. It did not become but there was a problem that degradation of a battery 14 could not be judged.

[0012] Then, even if this invention is the case that the discharge rate of a battery is high, it aims at offering the degradation judging approach of of the feeder system non-cut [the electric current] off and battery which can judge degradation of a battery easily.

[0013]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem and to attain the purpose, invention indicated by claim 1 While connecting with juxtaposition at said output terminal with the power feed zone which supplies a direct current to the load section While floating charge of the time of said power feed zone actuation is carried out and controlling the battery which supplies a predetermined direct current to said load section, and the output voltage of said power feed zone at the time of said power feed zone un-operating It has the control section which measures the output current. Said control section Are more than the electrical potential difference to which said load section carries out normal actuation of the output voltage of said power feed zone, and it is made to fall to an electrical potential difference lower than the open circuit voltage of said battery, and degradation of said battery was judged based on elapsed time until the output current of said power feed zone becomes beyond a predetermined value.

[0014] While connecting with juxtaposition at the output terminal of the power feed zone which supplies a direct current to the load section, invention indicated by claim 2 In the battery degradation judging approach of judging degradation of the battery by which floating charge of the time of said power feed zone actuation is carried out, and a predetermined direct current is supplied to said load section at the time of said power feed zone un-operating In the voltage drop process which is more than the electrical potential difference to which said load section carries out normal actuation of the output voltage of said power feed zone, and is reduced to an electrical potential difference lower than the open circuit voltage of said battery, and makes said battery a discharge condition, and this voltage drop process The degradation judging process of judging degradation of said battery based on the current value from said power feed zone to said load section was provided.

[0015] Invention indicated by claim 3 was made to judge based on elapsed time until, as for said degradation judging process, said current value becomes beyond a predetermined value. As a result of providing the above-mentioned means, the following operations arise. That is, a control section is more than an electrical potential difference to which the load section carries out normal actuation of the output voltage of a power feed zone, and is making it fall to an electrical potential difference lower than the open circuit voltage of a battery, and makes a battery discharge in invention indicated by claim 1. If a battery discharges and an electrical potential difference falls, since the electric power supply from a power feed zone will be resumed, degradation of a battery can be judged by detecting this.

[0016] It is more than the electrical potential difference to which the load section carries out normal actuation of the output voltage of a power feed zone, and a battery is made to discharge by invention indicated by claim 2 by making it fall to an electrical potential difference lower than the open circuit voltage of a battery. If a battery discharges and an electrical potential difference falls, since the electric power supply from a power feed zone will be resumed, degradation of a battery can be judged by detecting this.

[0017] In invention indicated by claim 3, since it was made to judge based on elapsed time until a current value becomes beyond a predetermined value, degradation of a battery can be judged easily.

[0018]

[Embodiment of the Invention] (a) of drawing 1 and (b) are drawings showing the feeder system 30 with which the

battery degradation judging approach concerning the gestalt of 1 operation of this invention is applied non-cut [the electric current] off, and drawing 2 is a graph which shows change of the battery terminal voltage at the time of judging degradation of a battery 34, the output current of a battery 34, and the output current of a power converter 32. In addition, the same sign is given to drawing 3 mentioned above in these drawings, and the same functional division as 4, and the detailed explanation is omitted.

[0019] It connected with the output terminal of the power source 31 of an alternating current or a direct current, and this power source 31, and the feeder system 30 non-cut [the electric current] off is equipped with the power converter 32 which outputs a predetermined electrical potential difference. The power converter 32 is equipped with the external output terminals 33a and 33b connected to the load equipments 20, such as communication equipment and a computer. Moreover, the battery 34 is connected to the external output terminals 33a and 33b of a power converter 32. Furthermore, while controlling the output voltage, the control section 35 which measures the output current is connected to the power converter 32.

[0020] Thus, at the time of stationary actuation, as the constituted feeder system 30 non-cut [the electric current] off is shown in (a) of drawing 1 , floating charge of the battery 34 is carried out while changing the power from a power source 31 in a power converter 32 and supplying load equipment 20. In addition, the output voltage of a power converter 32 is the floating charge electrical potential difference VF always fixed even when the input voltage and output voltage of a power source 31 are changed. It has the stabilization function which can be outputted.

[0021] When the electric supply from a power source 31 is continuing beyond fixed time amount (usually 24 hours or more) in such the condition, since a battery 34 is in a full charge condition, the floating charge currents to a battery 34 are few, and most currents which a power converter 32 outputs as shown in (a) of drawing 1 are supplied to load equipment 20 as the load current.

[0022] Moreover, as shown in (b) of drawing 1 , when supply of the power from a power source 31 stops by a certain cause, power is supplied to load equipment 20 because a battery 34 discharges, and load equipment 20 can receive supply of power continuously.

[0023] Degradation of a battery 34 is judged as follows. In addition, inside VF of (a) of drawing 2 It is the electrical potential difference at the time of the usual actuation, i.e., a floating charge electrical potential difference, (power-converter stationary output programmed voltage), and is VA. It is a programmed voltage at the time of the minimum electrical potential difference on which load equipment 20 can maintain normal actuation, i.e., power-converter loss of power, and VE. It is discharge final voltage (the load equipment permission minimum input voltage). Moreover, (b) of drawing 2 is the output current of a battery 34, and a graph with which (c) of drawing 2 shows change of the output current of a power converter 32.

[0024] the output voltage of a power converter 32 -- the time of power-converter loss of power -- programmed voltage VA up to -- it is made to fall, a battery 34 is made into a discharge condition, and the terminal voltage of a battery 34 is measured. if the battery 34 has deteriorated in connection with this -- fixed time amount after -- the time of loss of power -- programmed voltage VA up to -- battery terminal voltage falls. Supply of the power from the power converter 32 to load equipment 20 is resumed.

[0025] If the output current of a battery 34 declines as shown in (b) of drawing 2 , and (c), a current will be supplied to load equipment 20 from a power converter 32. The output current from this power converter 32 is detected by the control section 35. a control section 35 -- the output voltage of a power converter 32 -- the time of power-converter loss of power -- programmed voltage VA up to -- the time amount t after making it fall until the output current is detected was measured, and in being below the time amount as which this time amount t was determined beforehand, the battery 34 has deteriorated -- it judges.

[0026] As mentioned above, even if it is the case that the discharge rate of a battery 34 is high, in the feeder system 30 concerning the gestalt of this operation non-cut [the electric current] off, it is detecting the output current of a power converter 32, and degradation of a battery 34 can be judged easily.

[0027] In addition, you may make it detect the existence of the output current of a power converter 32, and may make it detect the magnitude of the output current in a control section 35. In addition, as for this invention, it is needless to say for deformation implementation to be variously possible in the range which is not limited to the gestalt of operation and does not deviate from the summary of this invention.

[0028]

[Effect of the Invention] According to invention indicated by claim 1, a control section is more than an electrical potential difference to which the load section carries out normal actuation of the output voltage of a power feed zone, and is making it fall to an electrical potential difference lower than the open circuit voltage of a battery, and makes a battery discharge. If a battery discharges and an electrical potential difference falls, since the electric power supply from

a power feed zone will be resumed, degradation of a battery can be judged by detecting this.
[0029] According to invention indicated by claim 2, it is more than the electrical potential difference to which the load section carries out normal actuation of the output voltage of a power feed zone, and a battery is made to discharge by making it fall to an electrical potential difference lower than the open circuit voltage of a battery. If a battery discharges and an electrical potential difference falls, since the electric power supply from a power feed zone will be resumed, degradation of a battery can be judged by detecting this.
[0030] Since it was made to judge based on elapsed time until a current value becomes beyond a predetermined value according to invention indicated by claim 3, degradation of a battery can be judged easily.

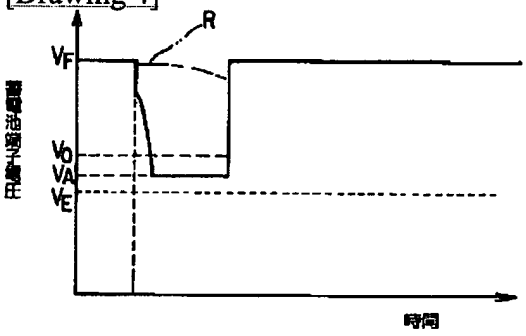
[Translation done.]

* NOTICES *

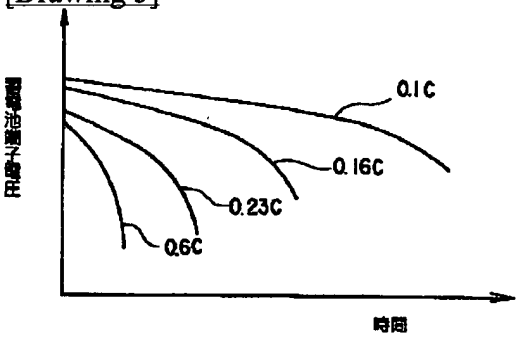
1:This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

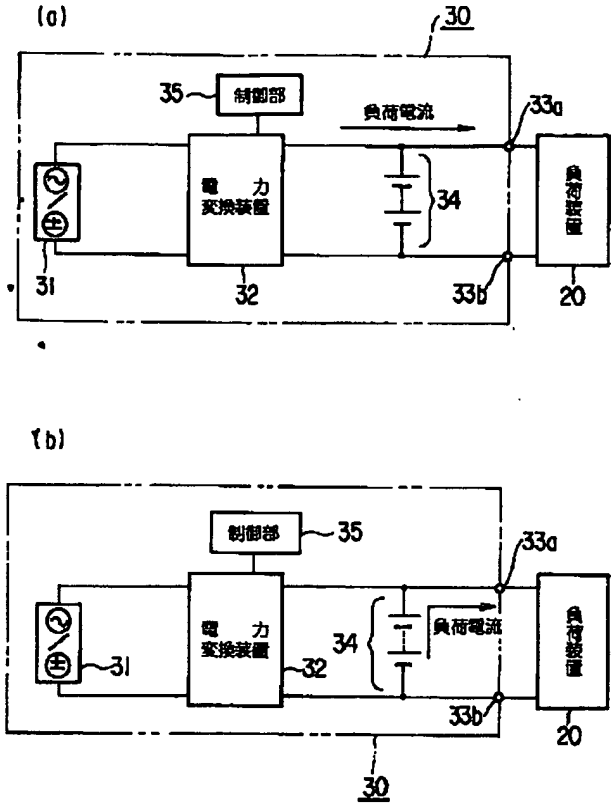
[Drawing 4]



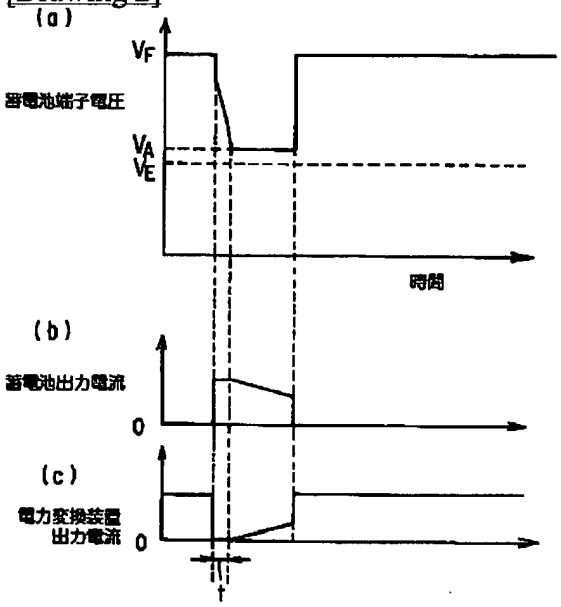
[Drawing 5]



[Drawing 1]

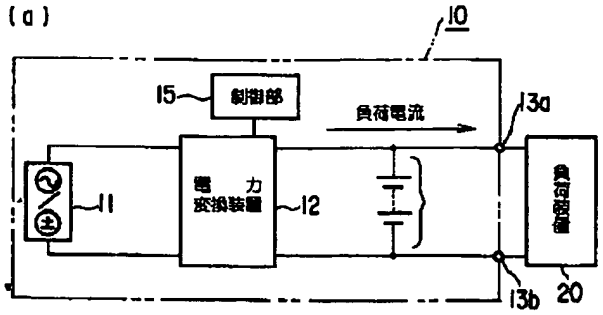


[Drawing 2]

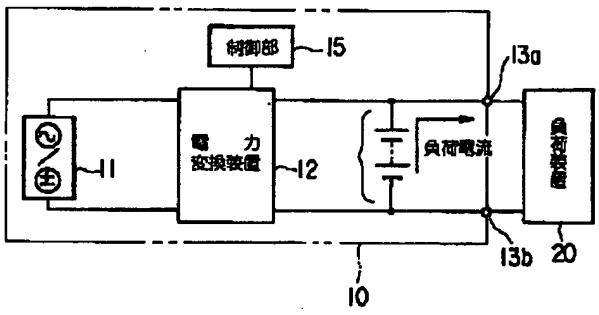


[Drawing 3]

(a)



(b)



[Translation done.]